DIFFERENCES IN MOTORIC AND ANTHROPOMETRIC SPACE BETWEEN 12-YEAR OLD BOY BASKETBALL PLAYERS AND STUDENTS

Fatmir Pireva[1], Shemsedin Vehapi[1], Branimir Mikić[2], Ardita Pireva[1], Esim Gashi[1], Diellza Kelmendi[1]

[1]AAB University, Prishtine, Kosovo

[2]Faculty of Education, University of Travnik

Original scientific paper

Abstract

The study included a total of 113, 12-year old male students. 55 students were regular students in grade 6 of lower secondary school, while 58 were of the same age but they attend regular exercises at basketball school. The sample was treated with 7 anthropometric variables, 4 basic motoric tests, and 6 situational motoric basketball tests. The purpose was to confirm relations and to determine what is the effect of active involvement of these students in regular workouts at the basketball school on differences in development of anthropometric features as well as basic kinaesthetic skills and situational skills in basketball game.

Keywords: *Correlations, differences, basketball players, students.*

Introduction

Establishment of a large number of basketball schools in our country in recent years poses another additional demand to recognize basic principles for programme development that are as qualitative as possible for player transformation. This fact gives us the opportunity to measure and compare kinaesthetic treatment effects in the sample, which regularly undergoes workout sessions. To reach the goal we need to consider multi-dimensional status of humans as well as the complexity of correlations among dimensions, especially in the research sample, which is at the most critical phase of growth and development. A large number of authors have addressed the similar topics to the one in this present study. Bojan Matkovič, a study published in 1984 with a sample of 115 basketball players aged 15-17 years old examined relations between morphologic characteristics and explosive strength. Authors S. Trniniç, D. Dizdar and Z. Fresel (1999), have confirmed differences in situational anthropometric and motoric indicators, where the players' status differed depending on anthropometric features and completion of motoric tasks. The study was completed with a sample of 115 players of 12 representations participating in Olympic Games in Atlanta in 1996. Another interesting study focused on diagnosing motoric and functional skills in basketball player selection is the one of the following authors: D. Milanovic, I. Jukic, 1996. Also, B. Dezhman (1996) has confirmed morphologic and motoric status of young basketball players, which is important information for effectiveness of basketball game.

Research purpose

Based on variables included in the study and methods selected for data processing, the research purpose relies on the following:

- Confirming relations between morphological and kinaesthetic spaces in two samples.
- Confirmation of relations between basic kinaesthetic and situational spaces.
- Confirmation of significant differences in two spaces between the samples.

Hypothesis

Based on the research purpose, the following hypotheses are presented:

- H1 - significant correlations will be obtained between two spaces.
- H2 – significant differences will be found between sportsmen and non-sportsmen.

Research sample

Research sample consists of 58 male students in grade 5, aged 12 ± 6 months in elementary school, and 55 students of the same age but who also exercise regularly at a basketball school. Since students attend school regularly and they complete tasks envisioned in physical education curriculum, then it is natural to assume that they are all able in terms of their psychophysical skills to go through such a test. We continuously took note of students' health condition during testing, and the sequence of tests was done in such a way that anthropometric measures were completed in the first afternoon, basic kinaesthetic tests were completed in the second, and situational movements were completed in the third one.

Variables

Anthropometric variables

To research anthropometric space, the following dimensions were included:

1. ABW- body weight
2. ABH-body height
3. AAL-arm's length
4. ABAL-both arms' length
5. AFL-foot length
6. ATHP-thigh perimeter
7. ACP-calf perimeter.

Measuring instruments

- Anthropometer
- Medicinal scale
- Millimetre stripe

Basic motoric variables

1. MSLJ-Stunding long jump
2. MHJ - High jump
3. MR20m- 20 metres ruunig
4. MBTH 1kg-throwing medicine ball weighing 1kg

Situational motoric variables

1. MR3X10m-running 3X10m forward-backwards
2. MSBD-slalom ball dribbling with 5 obstacles in a straight line
3. MSBDZ5- slalom ball dribbling with 5 zigzag obstacles
4. MTHBCH-throwing the ball from the chest in length
5. MTHBCH3S- throwing the ball from chest in 3 steps in length
6. MTHBW2m-throwing the ball to the wall from 2 metres distance.

Data analysis methods

Applied methods to execute the tasks for this study included descriptive statistical methods (parameters of central tendency, distributions, and correlations) and scientific method of condensation and transformation of results. Results have been analysed using SPSS 17.0 version software. Central tendency parameters included the following:

- Arithmetic mean
- Standard deviation
- Minimum and maximum values
- Skewness
- Kurtosis, and
- Correlations and cross-correlations.
-

Interpretation of basic statistical anthropometric parameters among students

Based on the results in the tables, it is worth mentioning that in most variables their distribution is within normal distribution limits, which implies that groups were homogenous in completing the tasks for fulfilling respective tests. Higher heterogeneity is observed among body weight and body mass parameters which is acceptable considering that we have a sample of students with significant differences in their body weight, especially considering their delicate age.

Table 1. Basic statistical anthropometric parameters among students

	N	Mini	Maxi	Mean	Std. Deviation	Variance	Skewness	Kurtosis
abw	58	300.00	619.00	405.74	77.93	6073.18	0.96	0.16
abh	58	1330.00	1590.00	1471.95	67.03	4492.86	0.10	-0.79
aal	58	570.00	718.00	640.97	31.93	1019.30	-0.06	-0.02
abal	58	1301.00	1630.00	1476.88	80.32	6451.58	-0.08	-0.34
afl	58	680.00	938.00	851.97	47.87	2291.75	-0.73	1.68
athp	58	333.00	610.00	454.07	54.68	2990.31	0.67	0.39
acp	58	262.00	390.00	307.57	29.90	894.14	0.85	0.20

Table 1. Basic statistical motoric parameters among students

	N	Mini	Maxi	Mean	Std. Deviation	Variance	Skewness	Kurtosis
mslj	58	120.00	185.00	151.93	16.54	273.47	-0.01	-0.69
mhj	58	23.00	40.00	29.91	4.22	17.83	0.24	-0.84
mr20m	58	3.58	4.99	4.36	0.28	0.08	-0.22	-0.01
mbth 1kg	58	300.00	560.00	410.79	55.85	3118.83	0.19	-0.09
mr3x10m	58	9.13	12.94	10.52	0.96	0.92	0.98	0.48
msbd	58	2.19	4.63	3.35	0.52	0.27	0.31	0.38
msbdz5	58	3.91	6.88	5.21	0.74	0.55	0.36	-0.26
mthbch	58	5.20	13.92	8.90	1.62	2.62	0.44	0.73
mthbch3s	58	4.50	11.20	7.42	1.38	1.90	0.46	0.55
mthbw2m	58	6.00	12.00	8.74	1.62	2.62	0.13	-0.76

Based on the results in the tables, it is worth mentioning that in most variables their distribution is within normal distribution limits, which implies that groups were homogenous in completing the tasks for fulfilling respective tests. Significant heterogeneity, but which did not miss normal distribution limits of results shown in the test of Mv3X10m, which implies that there were differences among students in acquiring tasks pertaining to immediate and drastic change of direction.

Basic statistical anthropometric parameters among basketball players

Table 3. Basic statistical anthropometric parameters among basketball players

	N	Mini	Maxi	Mean	Std. Dev	Variance	Skewness	Kurt
abw	55	309.00	910.00	526.42	118.62	14069.91	0.60	0.68
abh	55	1380.00	1823.00	1571.96	95.47	9115.04	-0.10	-0.05
aal	55	590.00	830.00	682.75	49.71	2471.45	0.43	0.91
abal	55	1100.00	1850.00	1500.27	134.36	18051.83	-0.73	2.08
afl	55	775.00	1035.00	916.00	59.27	3512.89	-0.48	0.10
athp	55	390.00	660.00	498.20	61.45	3776.39	0.46	-0.36
acp	55	280.00	435.00	338.60	37.93	1438.43	0.49	-0.59

Based on the results in the tables, it is worth mentioning that in most variables their distribution is within normal distribution limits, which implies that groups were homogenous in completing the tasks for fulfilling respective tests. Contrary to regular school students' group, the students of basketball school did not show heterogeneous values with regard to body weight. Which is reasonable considering that regular activities during exercise sessions have affected the students not to have higher body weight values.

Table 4. Basic statistical motoric parameters among basketball players

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	Kurtosis
mslj	55	120.00	200.00	149.56	19.81	392.36	0.82	0.27
mhj	55	15.00	46.00	32.13	6.30	39.63	-0.56	0.55
mr20m	55	3.50	5.03	4.17	0.32	0.10	0.18	0.69
mbth 1kg	55	3.40.	10.20	6.80	18.69	33.23	0.55	-1.00
mr3x10m	55	8.04	11.67	9.80	0.64	0.41	-0.27	2.20
msbd	55	2.41	4.46	3.28	0.38	0.15	0.77	0.94
msbdz5	55	3.93	6.97	5.11	0.44	0.20	1.08	5.32
mthbch	55	4.50	14.00	11.00	1.74	3.01	-1.01	2.80
mthbch3s	55	5.10	11.20	8.40	1.23	1.51	-0.40	0.47
mthbw2m	55	9.00	14.00	11.40	1.01	1.02	-0.22	0.24

Table 2 shows basic statistical parameters, which analysed the means, standard deviation and distribution of results around their arithmetic mean as well as normality of distribution of results for basketball players. Regarding this analysis in these tables, it is worth mentioning that in most variables the distribution is within normal distribution limits, which implies that groups were homogenous in completing the tasks for fulfilling respective tests.

Correlations among variables

Correlations between anthropometric and motoric variables among students

Table 5. Coorelations amoung studentes sampel

	apt	alrt	agjkrah	agjkrahsh	agjkemb	apkofsh	apkerc	mkvgjat	mkvlart	mvr20m	mhmbu	mv3x10m	mutsd	mutszz	mgjtb3h	mgjtbl	mgjtb2m
abw	1.000																
abh	0.669**	1.000															
aal	0.675**	0.859**	1.000														
abal	0.603**	0.813**	0.800**	1.000													
afl	0.601**	0.772**	0.733**	0.648**	1.000												
athp	0.870**	0.492**	0.608**	0.488**	0.448**	1.000											
acp	0.866**	0.555**	0.578**	0.533**	0.473**	0.880**	1.000										
mslj	-0.232	-0.015	0.026	-0.004	-0.119	-0.244	-0.131	1.000									
mhj	0.051	0.133	0.039	0.043	0.198	0.017	0.124	0.250	1.000								
mr20m	0.165	0.079	0.061	0.006	-0.084	0.168	0.168	-0.228	-0.503**	1.000							
mbth 1kg	0.370**	0.543**	0.555**	0.586**	0.456**	0.279*	0.430**	0.257	0.254	-0.169	1.000						
mr3x10m	0.388**	0.171	0.164	0.218	0.159	0.417	0.364	-0.583**	-0.165	0.219	-0.144	1.000					
msbd	0.211	0.060	0.148	0.059	0.145	0.320	0.195	-0.384**	-0.109	0.169	-0.288*	0.636**	1.000				
msbdz5	0.024	-0.109	-0.028	-0.072	-0.074	0.153	0.046	-0.351**	-0.153	0.157	-0.301*	0.357**	0.475**	1.000			
mthbch	-0.046	0.131	0.062	0.131	0.002	-0.112	-0.002	0.571**	0.248	-0.277*	0.500**	-0.460**	-0.520**	-0.588**	1.000		
mthbch3s	-0.205	0.006	-0.020	0.042	-0.082	-0.241	-0.126	0.451**	0.223	-0.240	0.472**	-0.460**	-0.416**	-0.465**	0.736**	1.000	
mthbw2m	-0.001	0.174	0.106	0.207	0.046	-0.071	0.117	0.439**	0.148	-0.151	0.532**	-0.390**	-0.584**	-0.397**	0.651**	0.618*	1.000

Table above shows correlation coefficients between anthropometric and motoric variables among students. From the obtained results we observe that in most cases the values do not show any significant correlations. There were significant correlations in the following tests: throwing medicine ball with all anthropometric tests. Other anthropometric variables did not show any correlations with motoric tests. Running 3x10am with the body weight had a value of 0.388. More significant correlations were observed among situational motoric tests, where all tests were strongly correlated among themselves, which is understandable or applied tests were strongly correlated and did not pose any major problem.

Correlations between anthropometric and motoric variables among basketball players

Table 6. Correlation amoung basketball players sampel

	apt	alrt	agjkrah	agjkrahsh	agjkemb	apkofsh	apkerc	mkvgjat	mkvlart	mvr20m	mv3x10m	mutsd	mutszz	mgjtb3h	mgjtbl	mgjtb2m	mhmbu
abw	1.000																
abh	0.430**	1.000															
aal	0.317*	0.785**	1.000														
abal	0.469**	0.813**	0.689**	1.000													
afl	0.277*	0.836**	0.718**	0.725**	1.000												
athp	0.864**	0.137	0.070	0.300*	0.095	1.000											
acp	0.787**	0.271	0.182	0.405**	0.256	0.859**	1.000										
mslj	-0.224	0.338*	0.316**	0.244	0.302*	-0.367**	-0.238	1.000									
mhj	-0.197	0.308*	0.206	0.190	0.386**	-0.327*	-0.152	0.598**	1.000								
mr20m	0.101	-0.324*	-0.409**	-0.155	-0.230	0.241	0.200	-0.658**	-0.504**	1.000							
mr3x10m	0.216	-0.269*	-0.283*	-0.148	-0.217	0.316*	0.280*	-0.644**	-0.452**	0.718**	1.000						
msbd	-0.002	-0.124	-0.184	0.062	-0.091	0.064	0.107	-0.348**	-0.461**	0.533**	0.435**	1.000					
msbdz5	0.085	-0.317*	-0.250	-0.145	-0.242	0.224	0.246	-0.533**	-0.497**	0.557**	0.669**	0.640**	1.000				
mthbch	0.210	0.508**	0.391**	0.399*	0.463**	0.099	0.202	0.428**	0.528**	-0.439**	-0.452**	-0.504**	-0.510**	1.000			
mthbch3s	0.074	0.120	0.026	0.124	0.179	0.009	0.212	0.166	0.165	0.027	-0.090	-0.034	-0.165	0.325*	1.000		
mthbw2m	0.202	0.411**	0.428**	0.329*	0.473**	0.140	0.209	0.538**	0.481**	-0.500**	-0.407**	-0.305*	-0.338*	0.535**	0.099	1.000	
mbth 1kg	0.413**	0.163	0.109	0.264	0.235	0.451**	0.433**	-0.319*	0.155	0.107	0.087	-0.172	0.109	0.283**	0.161	0.006	1.000

The above tables shows correlation coefficients between anthropometric and motoric variables among basketball players. From the obtained results we observe that compared to results from the students group, basketball players are a more homogenous group. This occurs because this is a selected group and the tests for them are easier to be executed and subsequently their results are better. We observe weak correlations in body weight variable with motoric tests with exception of the test with ball throwing where the obtained value is quite high at .413 at level of significance of 0.005. In general, anthropometric variables do not show strong correlations with motoric variables, which means that the age of the research sample is developing and we still don't see a significant development. The test with throwing the ball from the chest does not show significant correlation with other variables, except for variable of throwing the ball in three steps, which had a level of significance of 0.01. The majority of obtained results do not show any significant correlation or significant correlation value. Significant correlation values were obtained only in the following tests: throwing of medicine ball with all anthropometric tests. Meanwhile other motoric tests did not show any significant correlations with motoric tests. Running of 3x10m with body weight had a coefficient of 0.388. A more significant correlation was found in situational motoric tests, where the majority of tests have strong correlations among them and obtained values show higher correlations, which is understandable or applied tests were correlated among themselves and practice.

Differences between students and basketball players

To research differences between students and basketball players, the t-test methods was used. Through this method, differences between arithmetic average between the two groups are compared. The following table shows differences between the two arithmetic averages, t-test value, and level of significance. Based on the obtained results from this method, we can state that significant statistical differences were obtained in most tests included in the research. With regard to anthropometric space, significant statistical differences were found in all variables, with exception of ABALvariable where t value is -.888 and level of significance is Sig. .379. In all other variables the t-value and level of significance meet the statistical validity requirement to confirm significant statistical differences. In all cases where significant statistical differences were found, those differences are in favour of basketball players. This overview of results conclude that regular engagement in basketball-related exercising activities have contributed to better development of growth dimensions of body height and limbs as well as values of perimeter of thighs and calf. In the basic motoric space differences found in all tests are in favour of basketball players which shows a higher level of basic kinaesthetic skills among the active basketball players' group compared to students' category. In all tested variables regarding arms and legs explosive force and speed of executing movements basketball players were more successful. In the situational motoric space, there were no significant differences only in slalom dribbling, and certainly this was a result of very short time for executing the task 3-5 sec and use of manual technique to measure beginning and end of the task (a hand chronometer was used) and the age tests is quite delicate and heterogeneous due to fast growth of the body and delays in muscle development, and subsequently difficulties might have occurred among basketball players of this age group to execute coordination movements. In all other variables that required speed of running forward and backwards, explosive force of arms to throw the ball and precision in throwing the ball from one player to

another, basketball players were more successful. Based on these obtained results through the t-test method where differences between groups were examined, we can state that the group of basketball players showed significantly better results both in anthropometric and basic motoric space as well as in situational motoric. Studies of other authors have also found similar differences when we compare groups of sportsmen and non-sportsmen in various ages and categories. This highlights one more time the importance of sports activities for younger age groups in order that they not only develop and grow better but also to affect their kinaesthetic skills which would play a significant role in completion of sports tasks as well as in completing other daily life activities.

T-test between basketball players and students in motoric and anthropometric variables

Table 7. Differences amoung two groups

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	abw	-118.29	147.98857	19.95478	-158.29782	-78.28399	-5.928	54	.000
Pair 2	abh	-97.56	126.10559	17.00407	-131.65475	-63.47252	-5.738	54	.000
Pair 3	aal	-40.69	62.48226	8.42511	-57.58223	-23.79959	-4.830	54	.000
Pair 4	abal	-19.10	159.63508	21.52519	-62.26450	24.04632	-.888	54	.379
Pair 5	afl	-58.38	86.85375	11.71136	-81.86168	-34.90196	-4.985	54	.000
Pair 6	athp	-42.36	81.76080	11.02462	-64.46668	-20.26060	-3.843	54	.000
Pair 7	acp	-30.20	51.55809	6.95209	-44.13811	-16.26189	-4.344	54	.000
Pair 8	mkvgjat	2.29	23.09134	3.11364	-3.95156	8.53337	.736	54	.465
Pair 9	mkvlart	-2.36	7.97766	1.07571	-4.52030	-.20697	-2.197	54	.032
Pair 10	mvr20m	.18745	.40672	.05484	.07750	.29741	3.418	54	.001
Pair 11	mhmbu	-208.07273	196.63793	26.51465	-261.23141	-154.91405	-7.847	54	.000
Pair 12	mr3x10m	.75691	1.10082	.14844	.45931	1.05450	5.099	54	.000
Pair 13	msbd	.07582	.66915	.09023	-.10508	.25671	.840	54	.404
Pair 14	msbdz5	.10473	.92203	.12433	-.14453	.35399	.842	54	.403
Pair 15	mthbch	-2.12473	2.17065	.29269	-2.71154	-1.53792	-7.259	54	.000
Pair 16	mthbch3s	-1.07182	1.71816	.23168	-1.53630	-.60734	-4.626	54	.000
Pair 17	mthbw2m	-2.67273	1.99123	.26850	-3.21103	-2.13442	-9.954	54	.000

Confirmation of hypotheses

Applying appropriate methods and procedures for transformation of results, we managed to confirm hypotheses:

- H1. That significant correlations would be obtained between two spaces, this was partially confirmed, since relevant relations were found between anthropometric and motoric dimensions.
- H2. That significant differences would be obtained between sportsmen and non-sportsmen samples, this was fully confirmed since differences were found in favour of basketball players' sample.

References

Aliu, M. (1999). Zhvillimi i disa karakteristikave morfologjike dhe Motorike të popullatës shkollore dhe ndryshimet në ato karakteristika në varshmëri me moshën kronologjike, Disertacion doktorature, FKF, Sarajevë.

Aliu, M. (1997). Biomotorika. Tekst universitar. Universiteti i PrishtinësFKF, Prishtinë.

Despot, A. M.V. Štalec.(1983). Razlike medju dvanastogodisnjim učenicima u ekim konativnim, morfoloskim i motorickim osobinama. Kineziologia, vol.5.Zagreb.

Rushiti, H.(1999). Struktura faktoriale e dimensioneve antropometrike dhe relacioni i tyre me disa aftësi motorike te të rinjtë e moshës 13-14 vjeç. Punim magjistrature, FKF i UP, Prishtinë.

Gjinolli, E. (1997). Karakteristikat antropometrike dhe motorike të vlefshme për volejboll te nxënësit e klasës së pestë-V- të shkollës fillore."Disertacioni i doktoraturës F.K.F Prishtinë.

Metikoš me autorë.: (1990). Razvojne karakteristike opće motoričke sposobnosti učenika. Kineziologija 22, nr. 1-2 Zagreb.

Kasa, A,.(1996). Bazat e stërvitjes me fëmijet e moshës 10-14 vjeç nga Tirana''.Instituti i lartë i kulturës fizike,I-K-F''Vojo Kushi''.Tiranë.

BASKETBOLL – Tekst Mësimor – Dr.sc. Hazir Salihu. Fakulteti i Kulturës Fizike dhe Sportit. (2006) – Pr-

ishtinë.

Wissel, H.(2004).Basketball steps to success" Assistant coach Memphis Grizzlies National Basketball Association. USA.

FIBA. "Basketball for Young Players". Guidelines for Coaches. FIBA, München, 2000 Germany

Pireva, F. .(1999), Lidhmëritë dhe karakteristikat e aftësive motorike dhe masave antropometrike te nxënsit e moshës 11 vjeçre Acta kineziologika, Prishtinë.

H. Salihu (2003). Ndikimi i dimensioneve morfologjike në disa ndryshore lëvizore specifike te basketbollistët e rinj. Studime sportive nr. 2. Tiranë.

RAZLIKE U MOTORIČKOM I ANTROPOMETRIJSKOM PROSTORU IZMEĐU 12-GODIŠNJIH DJEČAKA KOŠARKAŠA I UČENIKA

Sažetak

U istraživanju je sudjelovalo ukupno 113, 12 godina starih učenika. Učenici su redoviti učenici 6. razreda niže gimnazije, dok je 58 bilo iste dobi, ali su redovno trenirali u školi košarke. Uzorak je tretiran sa 7 antropometrijskih varijabli, 4 osnovna motorička testa i 6 situacijskih motoričkih košarkaških testova. Cilj je bio utvrditi odnose i odrediti kakav je učinak aktivnog uključivanja tih učenika u redovne treninge u košarkaškoj školi na razlike u razvoju antropometrijskih značajki, kao i osnovnim vještinama kinestetičkih i situacijskih vještina u košarkaškoj utakmici.

Ključne riječi: *Korelacije, razlike, košarkaši, učenici.*

Received: November 17, 2015

Accepted: December 10, 2015

Correspondence to:

Branimir Mikić

Faculty of Education, University of Travnik, Bosnia and Herzegovina,

E-mail: branotuzla@gmail.com